FEMI.209: 180385

ORIGINAL

FLOOD INSURANCE STUDY

COMPLETED
21

TOWN OF ROME CITY, INDIANA

NOBLE COUNTY

APRIL 15, 1982

Federal Emergency Management Agency

COMMUNITY NUMBER - 180385

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgements	1
1.3	Coordination	1
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	2
2.3	Principal Flood Problems	4
2.4	Flood Protection Measures	4
3.0	ENGINEERING METHODS	4
3.1	Hydrologic Analyses	5
3.2	Hydraulic Analyses	5
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	6
4.1	Flood Boundaries	6
4.2	Floodways	7
5.0	INSURANCE APPLICATION	9
5.1	Reach Determinations	9
5.2	Flood Hazard Factors	10
5.3	Flood Insurance Zones	10
5.4	Flood Insurance Rate Map Description	11

TABLE OF CONTENTS (Continued)

		Page
6.0	OTHER STUDIES	11
7.0	LOCATION OF DATA	11
8.0	REFERENCES AND BIBLIOGRAPHY	13

FIGURES

Figure 1 -	Vicinity Map	3
Figure 2 -	Floodway Schematic	9

TABLES

Table 1 -	Summary of Elevations	5
Table 2 -	Summary of Discharges	5
Table 3 -	Floodway Data	8
Table 4 -	Flood Insurance Zone Data	12

EXHIBITS

Flood Profiles

Branch Creek Panel 01P

Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

TOWN OF ROME CITY,
NOBLE COUNTY, INDIANA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Rome City, Noble County, Indiana, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Town of Rome City to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Department of Agriculture, Soil Conservation Service (SCS), for the Federal Emergency Management Agency, under Inter-Agency Agreement No. IAA-H-11-79, Project Order No. 13. This study was completed in June 1981.

1.3 Coordination

Areas requiring detailed and approximate studies were identified at a meeting held at Rome City Town Hall, June 6, 1979. This meeting was attended by representatives of the SCS, FEMA, the Indiana Department of Natural Resources (IDNR) and the Town of Rome City.

On December 1, 1981, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Rome City, Noble County, Indiana, and its extraterritorial limits. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction for the next five years, through June 1986. The scope and methods of study were proposed to and agreed upon by FEMA and the Town of Rome City.

Sylvan Lake, Little Lake and Branch Creek within the extraterritorial limits were studied by detailed methods.

2.2 Community Description

The Town of Rome City is located in northeastern Indiana, in north-central Noble County. Surrounded by unincorporated areas of Noble County, the town is about 130 miles northeast of Indianapolis, 25 miles north of Fort Wayne and about 135 miles east-southeast of Chicago, Illinois. According to Census Bureau figures, the population has increased from 1,354 in 1970 to 1,394 in 1976 (Reference 1).

The mean July and January temperatures are 71.9 degrees Fahrenheit (F.) and 23.9 degrees F., respectively, with a mean annual temperature of 49 degrees F. Average annual precipitation of the region is 33.9 inches with an average snowfall of 36 inches. The precipitation is fairly uniformly distributed throughout the year (Reference 2).

Sylvan Lake lies within the town limits of Rome City. Many residential buildings occupy the shoreline of the lake. Henderson Lake Ditch drains into Sylvan Lake at the east edge of Rome City. Sylvan Lake discharges into Branch Creek near the west side of Rome City. Branch Creek joins the North Branch Elkhart River at Jones and Waldron Lakes.

BEST DOCUMENT AVAILABLE

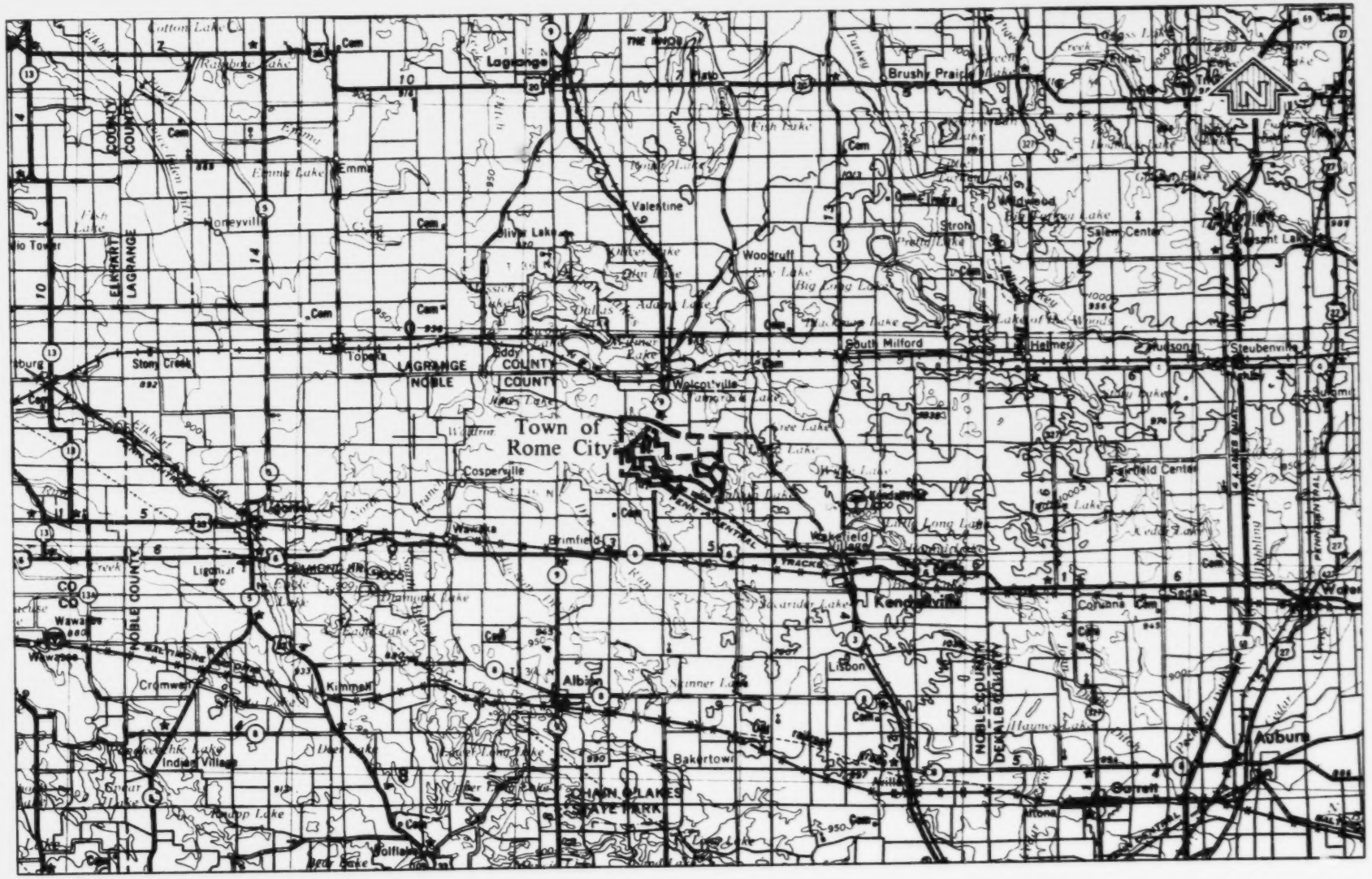


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF ROME CITY, IN
(NOBLE CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

The Elkhart River is the principal drainage outlet for Noble County. Formed by the confluence of the North Branch Elkhart River and the South Branch Elkhart River at a point about 3.5 miles east of Ligonier, Indiana, the Elkhart River flows northwestward to its junction with the St. Joseph River at Elkhart, Indiana.

2.3 Principal Flood Problems

Flooding may occur during any season of the year but is most likely to occur during the winter and early spring.

The highest recorded stages on Sylvan Lake are:

Elevation Feet (NGVD)	Year
917.56	1950
917.44	1943
917.30	1956
917.30	1959

2.4 Flood Protection Measures

No flood protection measures exist and none are planned in the foreseeable future.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 per cent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one per cent chance of annual occurrence) in any 50-year period is about 40 per cent (four in ten), and for any 90-year period, the risk increases to about 60 per cent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

All data on Branch Creek were taken from the Unincorporated Areas of Noble County, Indiana Flood Insurance Study (Reference 3). These data were also used for the Little Lake analysis. Basic data used in this study included topographic maps and streamflow records published by the U.S. Geological Survey (USGS) (Reference 4).

Analyses of elevations of Sylvan Lake were based on 32 years of lake gage records. The detailed investigation of the gage data included a log-Pearson Type III frequency analysis (Reference 5). Little Lake elevations were extracted from the upstream end of Branch Creek. A summary of elevations used in this study are shown in Table 1.

TABLE 1 - SUMMARY OF ELEVATIONS

LOCATION	ELEVATIONS (NGVD) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SYLVAN LAKE	917.4	917.5	917.6	917.8
LITTLE LAKE	894.5	894.8	894.9	895.2

Sylvan Lake elevations were coordinated with various water resource agencies by the IDNR (Reference 6). Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 2.

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BRANCH CREEK					
At East 150 Road	36.6	267	344	382	458

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

The hydraulic analyses for Branch Creek were taken from the Unincorporated Areas of Noble County, Indiana Flood Insurance Study (Reference 3).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using two-foot contour interval topographic maps (Reference 7). The flood boundaries for Branch Creek were taken from the Unincorporated Areas of Noble County, Indiana Flood Insurance Study (Reference 3).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map. Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. Under Indiana legislative acts and Natural Resources Commission policy guidelines (References 8, 9, 10 and 11), encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights, usually interpreted as no more than a 0.1-foot surcharge. However, with the approval of the IDNR, a floodway having no more than a 0.2-foot surcharge has been delineated for this study.

A floodway designation generally is not appropriate in areas which may be inundated by floodwaters over wetlands and where significant impoundment effects exist. Thus, no floodways have been computed for Sylvan Lake or Little Lake.

The floodway presented in this study for Branch Creek was computed on the basis of equal conveyance reduction from each side of the flood plain. The computed widths were plotted on maps at cross sections. Between cross sections the boundaries were interpolated. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

As shown on the Flood Boundary and Floodway Map, the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.2 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE[2]
BRANCH CREEK							
A	15,390	400	660	0.6	893.9	893.7	0.2
B	16,790	120	250	1.4	894.2	894.0	0.2

[1]FEET ABOVE MOUTH
[2]THIS SURCHARGE APPROVED BY INDIANA DNR

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF ROME CITY, IN
(NOBLE CO.)

FLOODWAY DATA

BRANCH CREEK

BEST DOCUMENT AVAILABLE

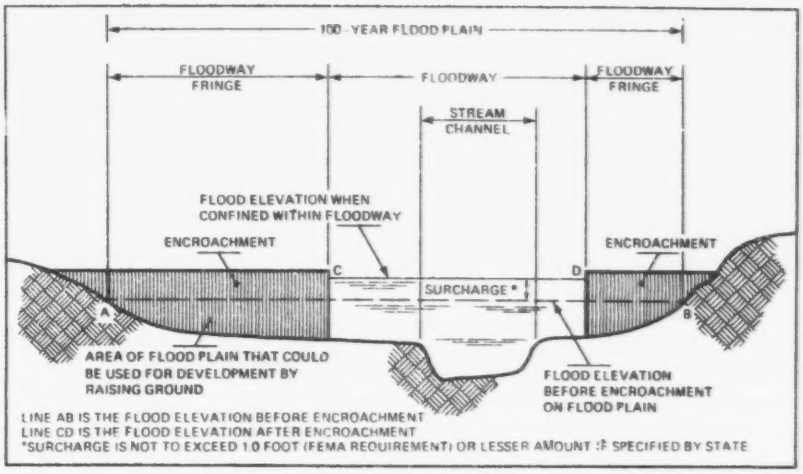

100 - YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

The floodways in this report are recommended to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source affecting the Town of Rome City.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 per cent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

BEST DOCUMENT AVAILABLE

The locations of the reaches determined for the Town of Rome City are shown on the Flood Profiles and are summarized in Table 4, "Flood Insurance Zone Data."

5.2 Flood Hazard Factors

The FHF is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Rome City was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A1:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Rome City is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by FEMA.

6.0 OTHER STUDIES

A Flood Insurance Study has been published for the Unincorporated Areas of Noble County, Indiana (Reference 3). This report will match the county study.

A Flood Hazard Boundary Map has been published for the community (Reference 12). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 300 South Wacker Drive, (24th Floor), Chicago, Illinois 60606.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
BRANCH CREEK							
REACH 1	0001	–0.4	–0.1	0.2	005	A1	VARIES–SEE MAP
SYLVAN LAKE							
REACH 1	0001	–0.2	–0.1	0.2	005	A1	918
LITTLE LAKE							
REACH 1	0001	–0.4	–0.1	0.3	005	A1	895

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF ROME CITY, IN
(NOBLE CO.)

FLOOD INSURANCE ZONE DATA

BRANCH CREEK - SYLVAN LAKE - LITTLE LAKE

BEST DOCUMENT AVAILABLE

8.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Commerce, Bureau of the Census, 1976 Population Estimates and 1975 and Revised 1974 Per Capita Income Estimates for Counties, Incorporated Places, and Selected Minor Civil Divisions in Indiana, Series P-36, No. 753, Washington, D.C.: Government Printing Office, 1979.

2. ————, National Oceanic and Atmospheric Administration, Climatography of the United States No. 81 (By State) Monthly Normals of Temperature, Precipitation and Heating and Cooling Degree Days 1941-70, August 1973; Climatic Atlas of the U.S., June 1968.

3. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Noble County, Indiana, January 1979.

4. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 feet: Kendallville, Indiana, 1973; Albion, Indiana, 1973; Wolcottville, Indiana, 1959; and Oliver Lake, Indiana, 1959 Quadrangles.

5. U.S. Water Resources Council, Bulletin No. 17, Guidelines for Determining Flood Flow Frequency, March 1976.

6. Indiana Department of Natural Resources, U.S. Army Corps of Engineers, U.S. Geological Survey and U.S. Department of Agriculture, Soil Conservation Service, Memorandum of Understanding, Coordination of Discharge Frequency on Indiana Streams, May 1976.

7. U.S. Geological Survey, Aerial Photography, Scale 1:24000, Contour Interval two feet: April 1979.

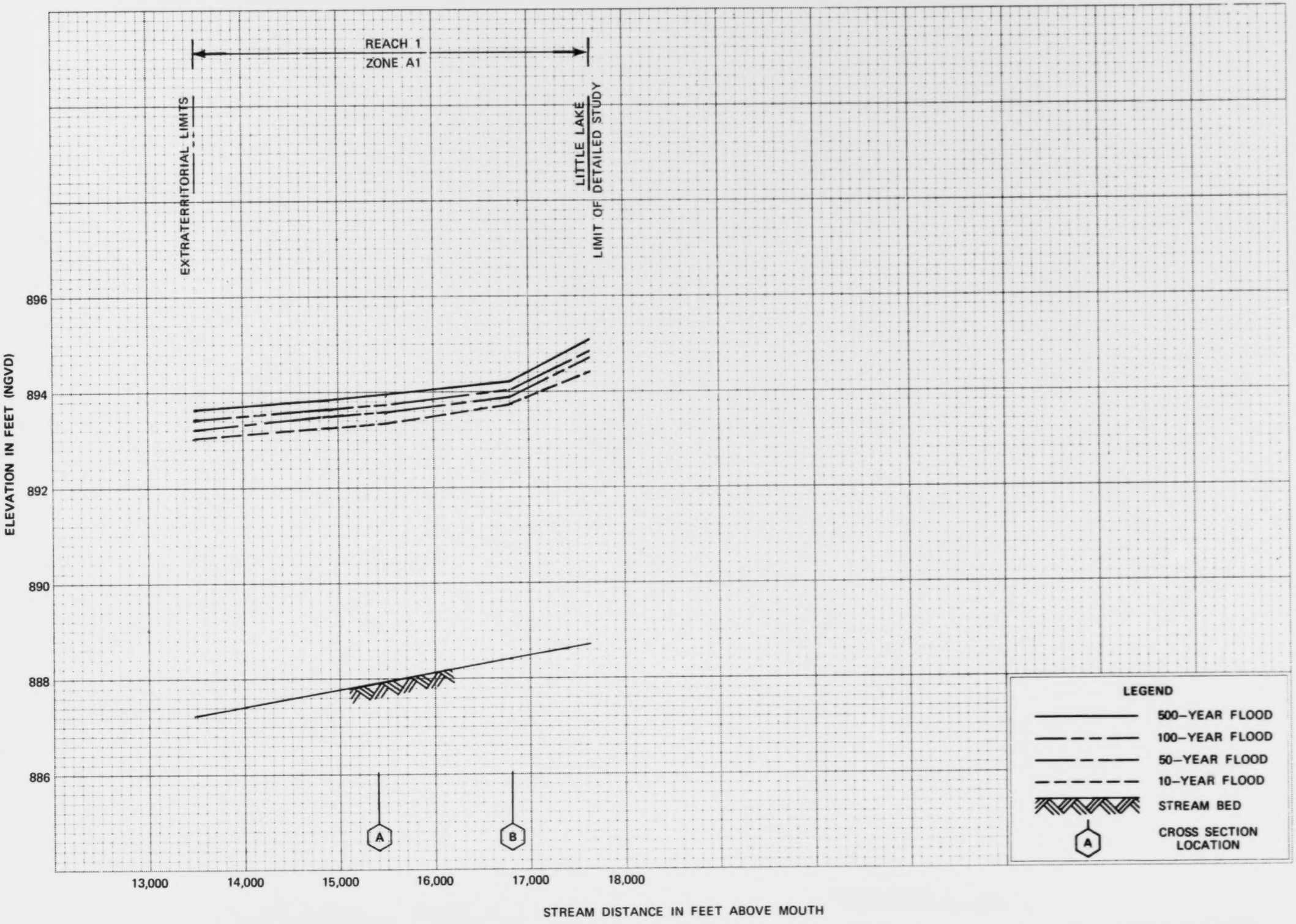
8. State of Indiana, Indiana Flood Control Act, 1945, as amended.

9. ————, Indiana Flood Plain Management Act, 1971, as amended.

10. ————, Flood Plain Management Rule Number FPM-1.

11. ————, Natural Resources Commission, Guidelines for Delineation of Floodways and Flood Hazard Areas, March 28, 1974.

12. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of Rome City, Indiana, July 1976.



FLOOD PROFILES

BRANCH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF ROME CITY, IN
(NOBLE CO.)

01P

BEST DOCUMENT AVAILABLE